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EXAMINER

AWAD, AMR A

ART UNIT	PAPER NUMBER
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2675

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/033,427

Applicant(s)

THEYTAZ ET AL.

Examiner

Amr Awad

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43, 45, 47, 48 and 51-58 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-43, 45, 47-48, 51-58 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 18-24, 40-43, 47-48, 51, and 54-57 are rejected under 35 U.S.C. 102(e) as being anticipated by Adan.

As independent claim 18, the claim is a method of manufacturing an efficient illumination system disclosed in independent claim 1. Therefore, it is inherent that the system described in claim 1 would have a method of manufacturing similar to the method described in claim 1. Therefore, the rejection of claim 1 above is substantially applied to the rejection of claim 18, except that claim 18 does not specify that the lens has entrance and exit surface positioned in a second angle, which makes the claim broad enough to considered the lens (155) as the claimed lens. However, after amending claim 1, the claim could be also interpreted in according to the new rejection of claim 1 below.

As to claim 19, as can be seen in figure 6, the light from the LED (104) flows through the opening (206) of the circuit board (158).

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As to claim 20, as can be seen in figure 6; Adan teaches that the light source is light emitting diode (104).

As to claim 21, Adan teaches that the light source has an angle of about 20 degrees of the flat surface (same orientation of the circuit board), which is within the range of 10 degrees and 45 degrees (col. 13, lines 5-7).

As to claim 22, Adan teaches using the device in an optical mouse or trackball (col. 4, lines 14-22).

As to independent claim 40, Adan (figures 5-6) teaches an illumination system (optical mouse 42) that includes an internal reflection (optical coupler 107) has an entrance surface (inlet end 142) positioned to gather light from the light source (104) in a first angle, a truncated light pipe (the pipe of the coupler 107) coupled to the entrance surface for directing the light, and a curved (outlet end 144) coupled to the light pipe for efficiently directing the light onto a surface (106) in a second angle (col. 11, lines 10-47).

As to claim 41, as can be seen in figure 5; the light pipe (the pipe of the optical coupler 107) is cone-shaped.

As to claim 42, as can be seen in figure 5, Adan shows that the light pipe (107) has a larger entrance (142) cross-section than exit cross-section (144).

As to claim 43, the shape in figure 5 of the optical pipe (107) can be considered as a cylindrical shape.

As to claim 47, using the broadest reasonable interpretation of the claim; we can consider that each side of the pipe is first and second reflective surface.

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As to claim 51, Adan shows a light source (LED 104).

As to independent claim 54, the claim is a broad version of independent claim 40 and would be analyzed as previously discussed with respect to claim 40 above.

As to claim 55, as can be seen in figure 5; the light pipe (107) is cone-shaped.

As to claim 56, the shape of the coupler (107) in figures 5-6 is a toroidal shape.

As to independent claim 57, Adan (figure 6) teaches a system for illuminating a target surface (optical mouse 42) that includes a light source (LED 104), positioned at angle relative to a circuit board (158), the light source emitting light through an opening (206), and a lens (155) having an entrance surface and an exit surface, wherein the entrance surface positioned to gather the light from the light source and the exit surface directing the light onto the target surface (col. 12, lines 16-34). Adan also shows in figures 15-18, that the shape of the lens (155) has an aspherical in the entrance surface, and the exit surface (the middle part of the lens 155) is fairly cylindrical. Note that with respect to claim 57, the claim still broad enough to be read to consider the lens to as element (155) in Adan's device. However, by considering the amendment and the remarks of the applicant's the claim can be also rejected similarly to consider the coupler (107) as the acted lens.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 4-7, 9-15, 25-37, 45-48 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adan et al. (US Patent NO. 6,531,692; hereinafter referred to as Adan).

As to independent claim 1, Adan (figure 6) teaches a system for illuminating a target surface (optical mouse 42) that includes a light source (LED 104), positioned at angle relative to a circuit board (158), the light source emitting light through an opening (206), and an optical coupler (107) having an entrance surface (inlet end 142) and an exit surface (outlet end 144), wherein the entrance surface positioned to gather the light from the light source and the exit surface directing the light onto the target surface (116) col. 11, lines 11-30 and col. 12, lines 16-34). Adan shows that the entrance surface and the exit surface are positioned at a second angle relative to each other (for that, Adan shows that the inlet surface is generally convex, while the outlet surface is concave, which makes a second angle between them) (col. 11, lines 17-30), the second angle dimensioned to fold a light beam from a first direction associated with the angle of the light source relative to the circuit board to a second direction associated with an impinging angle for illuminating the target surface (this is apparent from figure 5, wherein the light from the light source 104 has a certain direction (i.e., angle associated with the angle of the light source, and the output light from the outlet surface 144 has a direction associated with the angle of the outlet surface) (col. 11, lines 11-31).

Adan does not expressly teach that the optical coupler is a lens. However, according to Microsoft Bookshelf basics dictionary, a lens is "A ground or molded piece

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of glass, plastic, or other transparent material with opposite surfaces either or both of which are curved, by means of which light rays are refracted so that they converge or diverge to form an image".

Therefore, since the optical coupler (107) taught by Adan has two opposite surface for converge or diverge the light, it would be qualified as a lens that direct the light similar to the lens claimed in claim 1, and would be obvious to a person of ordinary skill in the art at the time the invention was made to realize that such part (107) is or can be a lens since it performs the same function of a lens, to appropriately directs the light to the target surface.

As to claims 2 and 4, the shape of the coupler (107) fairly reads on the limitations refraction and diffraction (because the two surfaces 142 and 144 are concave and convex).

As to claim 5, Adan teaches that the light source has an angle of about 20 degrees of the flat surface (same orientation of the circuit board), which is within the range of 10 degrees and 45 degrees (col. 13, lines 5-7).

As to claim 6, as can be seen in figure 6, the light from the LED (104) flows through the opening (206) of the circuit board (158).

As to claim 7, as can be seen in figure 6 and by considering the optical coupler (107) being part of the light source; the light source protrudes through the circuit board (col. 12, lines 23-29).

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As to claim 9, as can be seen in figure 5, the entrance surface of the coupler (107) has a curved surface for gathering the light emitted from the light source (104).

As to claim 10, as can be seen in figures 5-6, Adan shows the coupler (107) having an aspherical shape.

As to claim 11, as can be seen in figure 6, Adan shows that the coupler (107) has a curved surface for spreading light onto the target surface (106) (col. 11, lines 10-31).

As to claim 12, the shape of the coupler (107) in figures 5-6 is a toroidal shape.

As to claims 13-14, Adan teaches using the device in an optical mouse or trackball (col. 4, lines 14-22).

As to claim 15, as can be seen in figure 6; Adan teaches that the light source is a light emitting diode (104).

As to independent claim 25, the claim is a method corresponding to the system of claim 1, and would be analyzed as previously discussed with respect to claim 1.

As to claim 26, Adan teaches that the light source has an angle of about 20 degrees of the flat surface (same orientation of the circuit board), which is within the range of 10 degrees and 45 degrees (col. 13, lines 5-7).

As to independent claim 27, Adan (figure 6) teaches a system for illuminating a surface (optical mouse 42) that includes a light means (LED 104), positioned tilted relative to a surface (image detector 110), and a gathering means (coupler 107) for

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gathering the light (col. 12, lines 16-34), and a directing means (opening 206) for directing the light directly onto the surface (106) (col. 11, lines 10-31).

As to claim 28, as can be seen in figure 6; Adan teaches that the light source is light emitting diode (104).

As to claim 29, Adan teaches that the light source has an angle of about 20 degrees of the flat surface (same orientation of the circuit board), which is within the range of 10 degrees and 45 degrees (col. 13, lines 5-7).

As to claim 30, as can be seen above with respect to claim 27, Adan teaches that the gathering means is a lens (coupler 107, which is discussed above to be equivalent to a lens) positioned to gather the light from the light emitting means (104).

As to claim 31, Adan teaches using the device in an optical mouse or trackball (col. 4, lines 14-22).

As to independent claim 32, Adan (figure 6) teaches a coupler (107) that includes a first curved surface to gather light and a second curved surface, coupled to the first surface shaped for directing the light in an optical illumination system directly to target surface (110) using refraction (col. 11, lines 10-31).

As to claim 33, as can be seen in figures 15-16, Adan shows the coupler (107) having aspherical shape.

As to claim 34, the shape of the coupler (107) in figures 5-6 is a toroidal shape.

As to claim 35, Adan (figure 6) teaches a light source (104) for illuminating the first and second surface of the coupler (107).

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As to claims 36-37, Adan teaches using the device in an optical mouse or trackball (col. 4, lines 14-22).

As to claims 45 and 48, as can be seen below, Adan teaches all the limitations of claims 45 and 48 except the citation of having the first and the second reflective surfaces have a metal coating.

However, as can be seen in figure 5, Adan shows the light from the LED 104 reflected from the surface (107), which indicates a surface with a high reflectivity (i.e., metal surface).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to make the reflective surface of metal so as to provide high reflecting ratio with high reliability.

As to claim 58, as can be seen in figure 6, Adan shows that the surface (106) and the circuit board (158) are parallel.

5. Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adan in view of Smith (US patent NO. 6,476,970).

As to claim 3, as can be seen above, Adan teaches all the limitations of claim 3 except the citation of using a Fresnel lens.

However, Smith teaches illumination optics for an optical mouse that includes a Fresnel lens (figure 6). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching of Smith using

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Fresnel lens to be incorporated to Adan's device so as to be able to provide a compact uniform illumination beam that does not have blind spot.

As to claim 8, the shapes of the lens provided by Smith in figures 8-9 are fairly read on the limitation wedge shape of claim 8. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching of Smith using wedge lens to be incorporated to Adan's device so as to be able to provide a compact uniform illumination beam that does not have blind spot.

6. Claims 16-17,23-24,38-39 and 52-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adan in view of Bidiville (US patent NO. 6,084,574).

As can be seen above, Adan teaches all the limitations of claims 16-17, 23-24, 38-39 and 52-53 except the citation of having the lens made from glass or optical plastic.

However, Bidiville (figure 12B) teaches an optical mouse that includes lens (1220), which is made from glass or optical plastic (col. 16, lines 34-43).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the teaching of Bidiville having lens made from glass or optical plastic to be incorporated to Adan's device because such materials are known to be used in the manufacturing of lenses and known for its reliability and affordability.

Response to Arguments

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7. Applicant's arguments filed 08/03/2004 have been fully considered but they are not persuasive.

With respect to the objection to the title, the objection has been withdrawn.

As to independent claims 1, 25, 27 and 32, these claims have been amended, and the ground of rejection has been changed. Accordingly the rejection for these claims is now under 35 U.S.C. 103 first paragraph rejection in view of Adan.

Applicant's main argument with respect to these claims is that the coupler's entrance 142 and 144 surfaces are generally parallel. Examiner respectfully disagrees. Adan specifically states that entrance 142 is generally convex, and the entrance 144 is generally concave, which clearly shows that there is an angle between the two entrances. And even if we agree that the two entrances are parallel; it will be still safe to say that there is a 180 or 0 degree angle between them.

Applicant (middle of page 14) argued that Adan teaches the use of longer central portion to reduce the likelihood of electrostatic discharge, which directly contradicts the design advantages of smaller optical components provided by the present invention. Examiner respectfully submits that such limitation is not part of the claimed invention. Having the. As to applicant's argument (bottom of page 14) that lens (155) is not an illumination lens, examiner agrees with the applicant, however, the claims previously were broad enough to read on the cited element since no limitations in the claims are directed to having the lens as illumination lens.

Applicant (page 15) argued that the reference fails to point out any prior refractive lens, truncated light pipe, directing a light at a second angle, or folding a light

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beam from a first direction associated with the angle of the light source to a second direction associated with the impinging angle. Examiner respectfully disagrees. Having first angle and second angle does not necessarily means that the first and second angles have to be different from each other, similarly, the first and second directions do not necessarily means having different directions. It is clear from the rejection above, and from the cited reference, that Adan shows a truncated light pipe (figure 5), refractive lens (figure 5) and a folding light beam (figure 5).

With respect to argument for claim 45 and 48, examiner believes that using a metal coating for reflecting the light is well known in the art of light directing because metals known to be good light reflectors. Examiner also believes that claiming different types of lenses throughout the claims without providing a specific advantages of using such shapes makes having different types of lenses purely based on the designer choice, and can not have novelty.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amr Awad whose telephone number is (703)308-8485. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on (703)305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMR A. AWAD
PRIMARY EXAMINER

